

# BigBOSS

## Positioner Update

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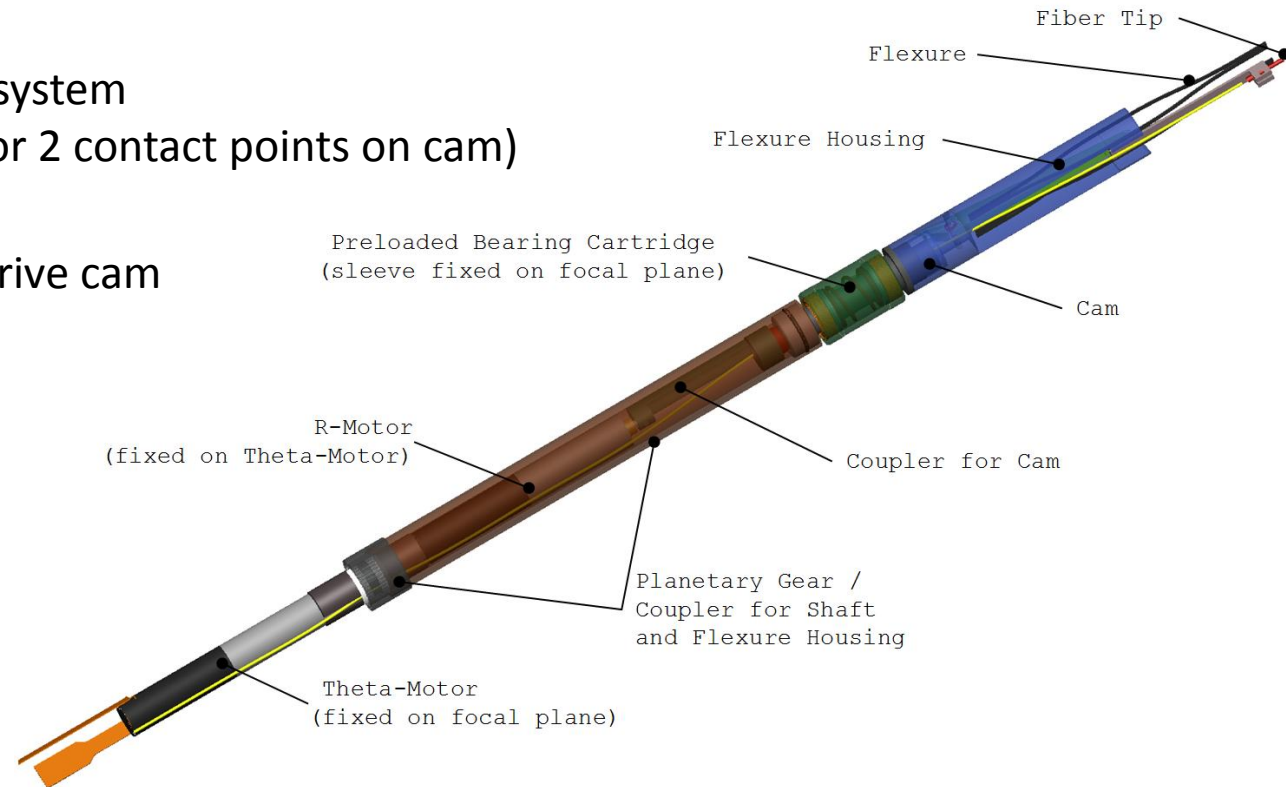
03/02/2011

# Initial Design for stationary Motors

- Coupler for cam allows  $\pm 120^\circ$  rotation before fiber winding starts
- Required coupler rotation:
  - $\pm 90^\circ$  cam rotation for flexure R-deflection
  - $\pm 180^\circ$  theta rotation of flexure housing including cam

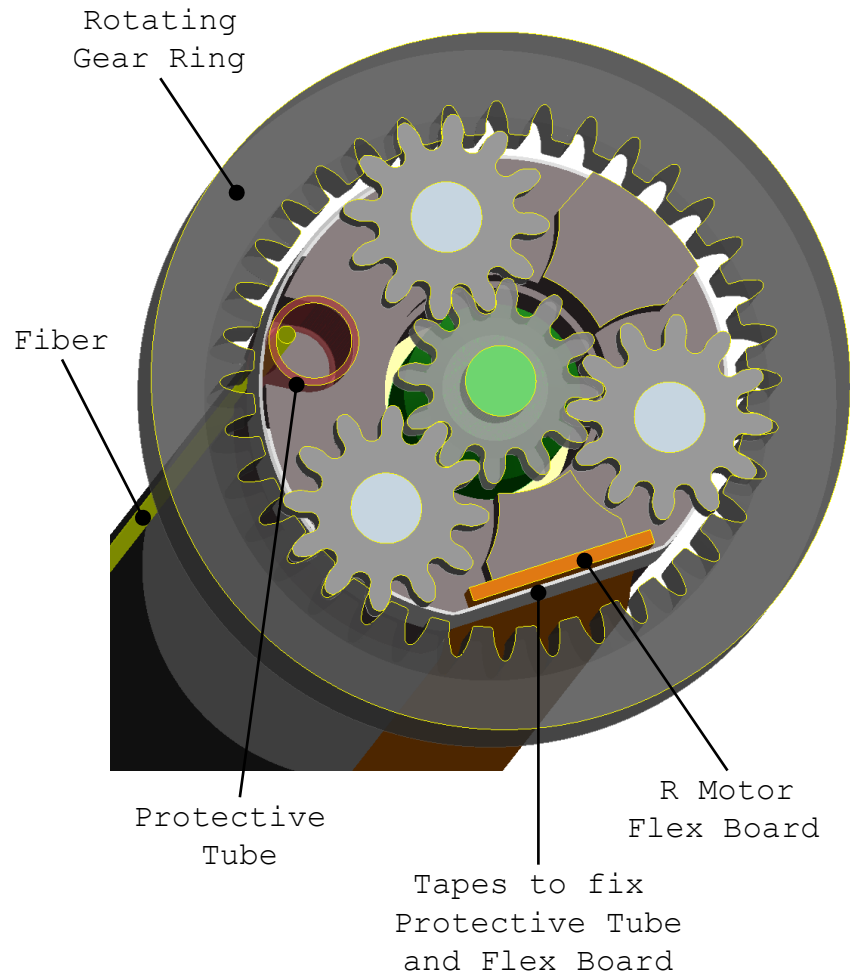
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=  $\pm 270^\circ$  total
- Solution A  
“Intelligent” control system  
(same R-deflection for 2 contact points on cam)
- Solution B  
2<sup>nd</sup> gear module to drive cam

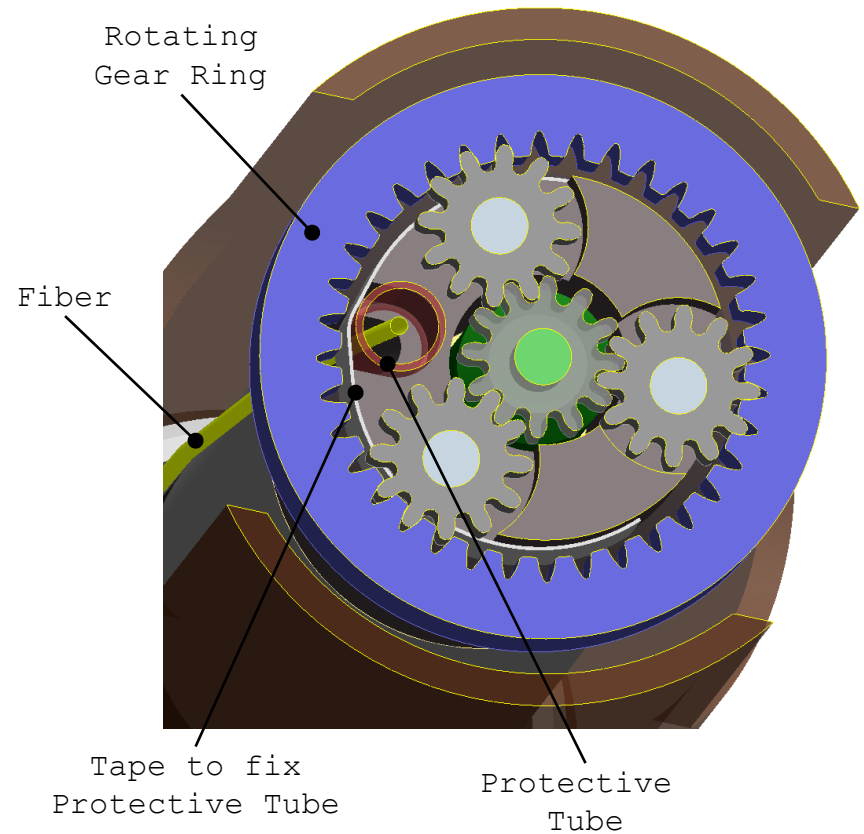


# Section through Gear Modules

OD 10 mm Gear Module  
for Theta Rotation



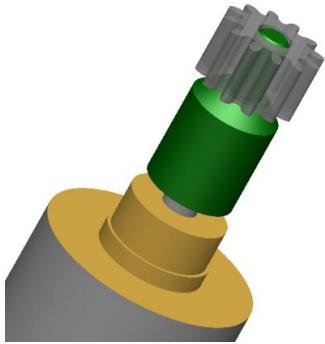
OD 8 mm Gear Module  
for R Deflection



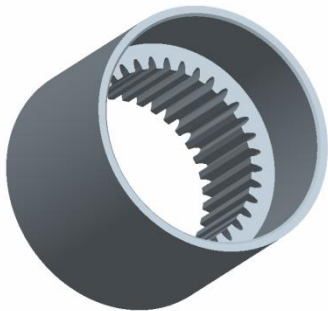
# Gear Modules

- Design based on Faulhaber gearhead components
- Modules (or gears) requested form MicroMo

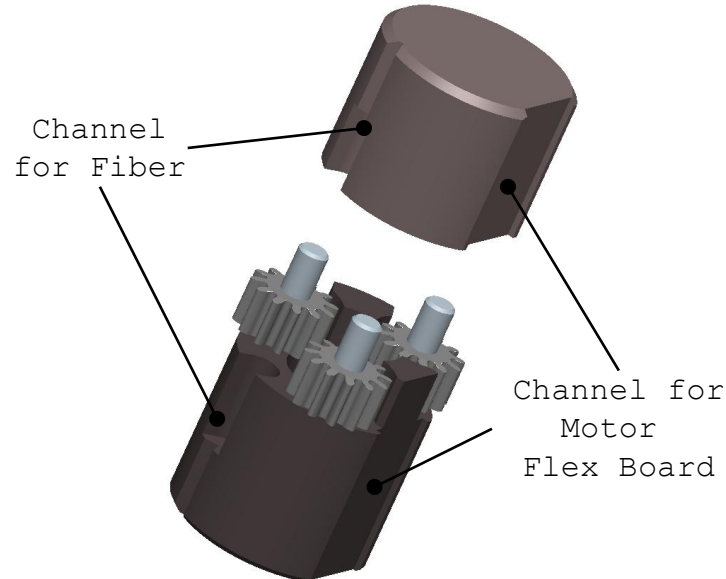
## Shaft Extension



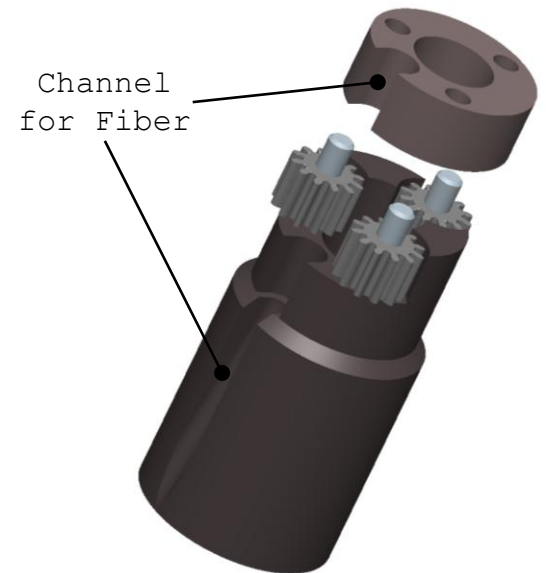
## Rotating Gear Ring



## Theta Gear Module

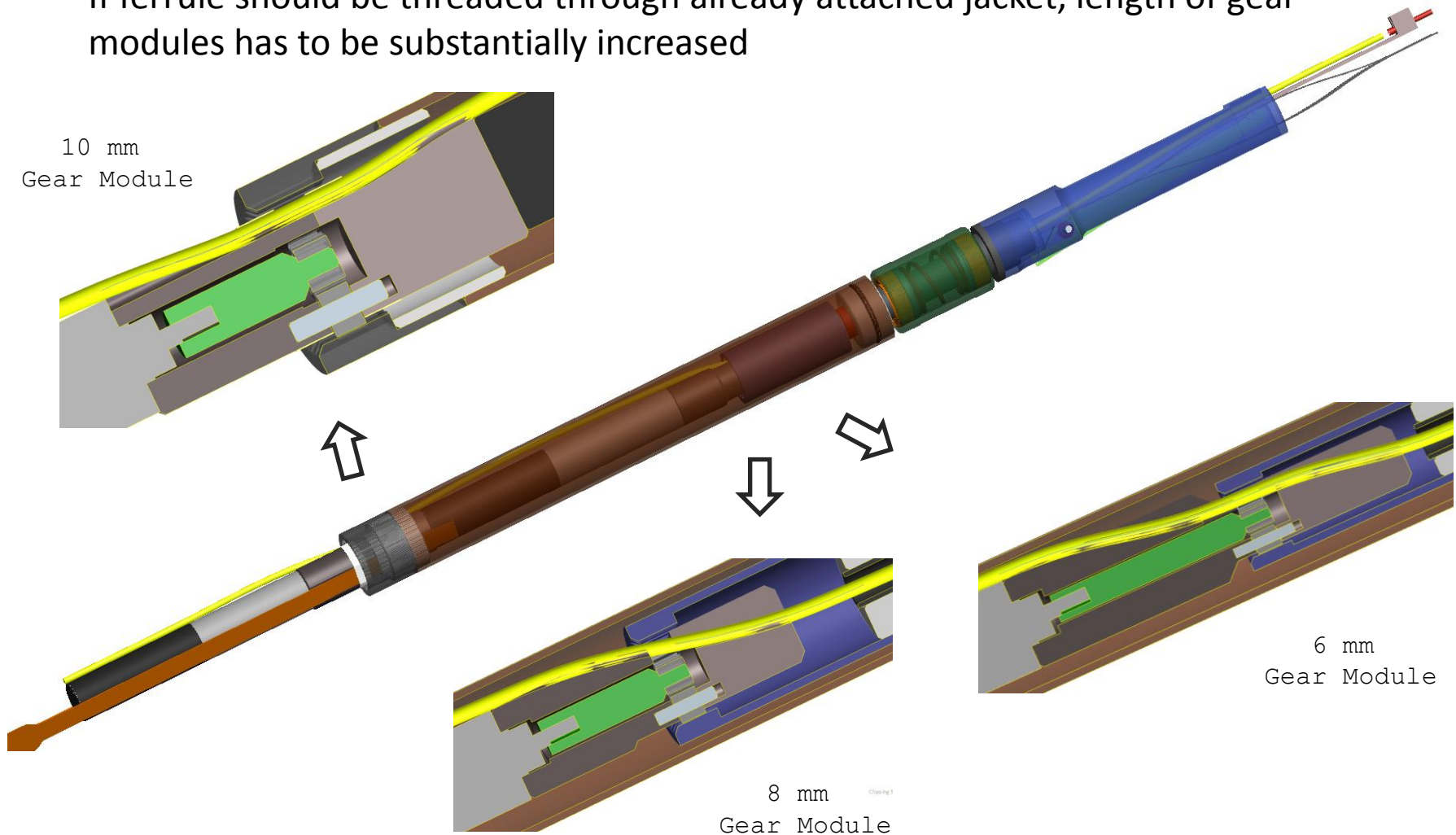


## R Gear Module



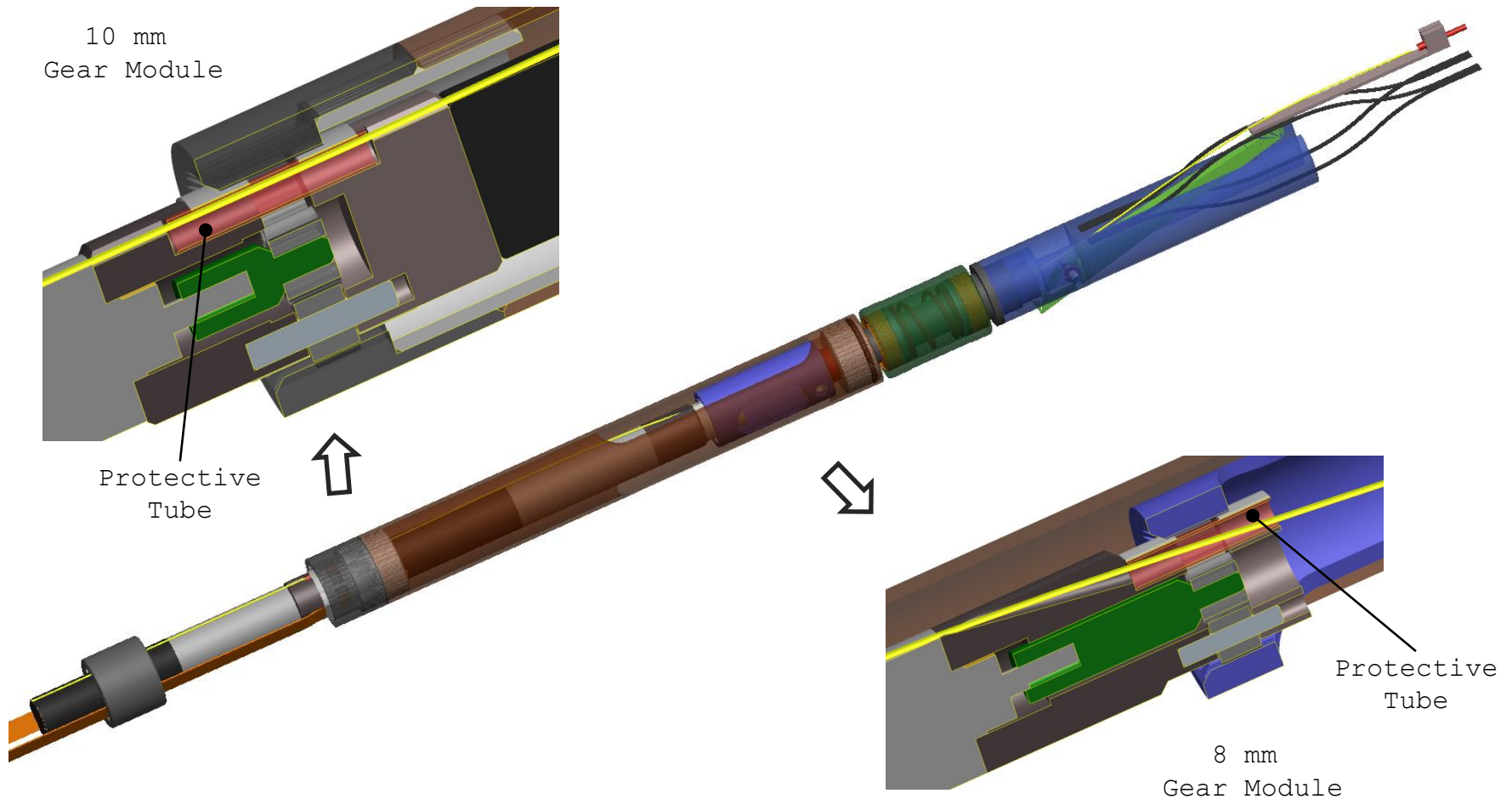
# Fiber Routing – Protective Jacket

- Max. jacket ID probably too small to thread ferrule through
- If ferrule should be threaded through already attached jacket, length of gear modules has to be substantially increased



# Fiber Routing – Protective Tubes

- Protective tubes to thread fiber through gear modules
- Jacket can be used between fiber tip and gear module



# Assembly Sequence

## 1<sup>st</sup> Step Assembly of mechanics front module

Includes:

- Bearing cartridge
  - Flexure housing with flexure and lever
  - Cam with shaft
  - Both rotating gear rings
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- Module can be separately mounted on focal plane
  - Front- or backside insertion possible

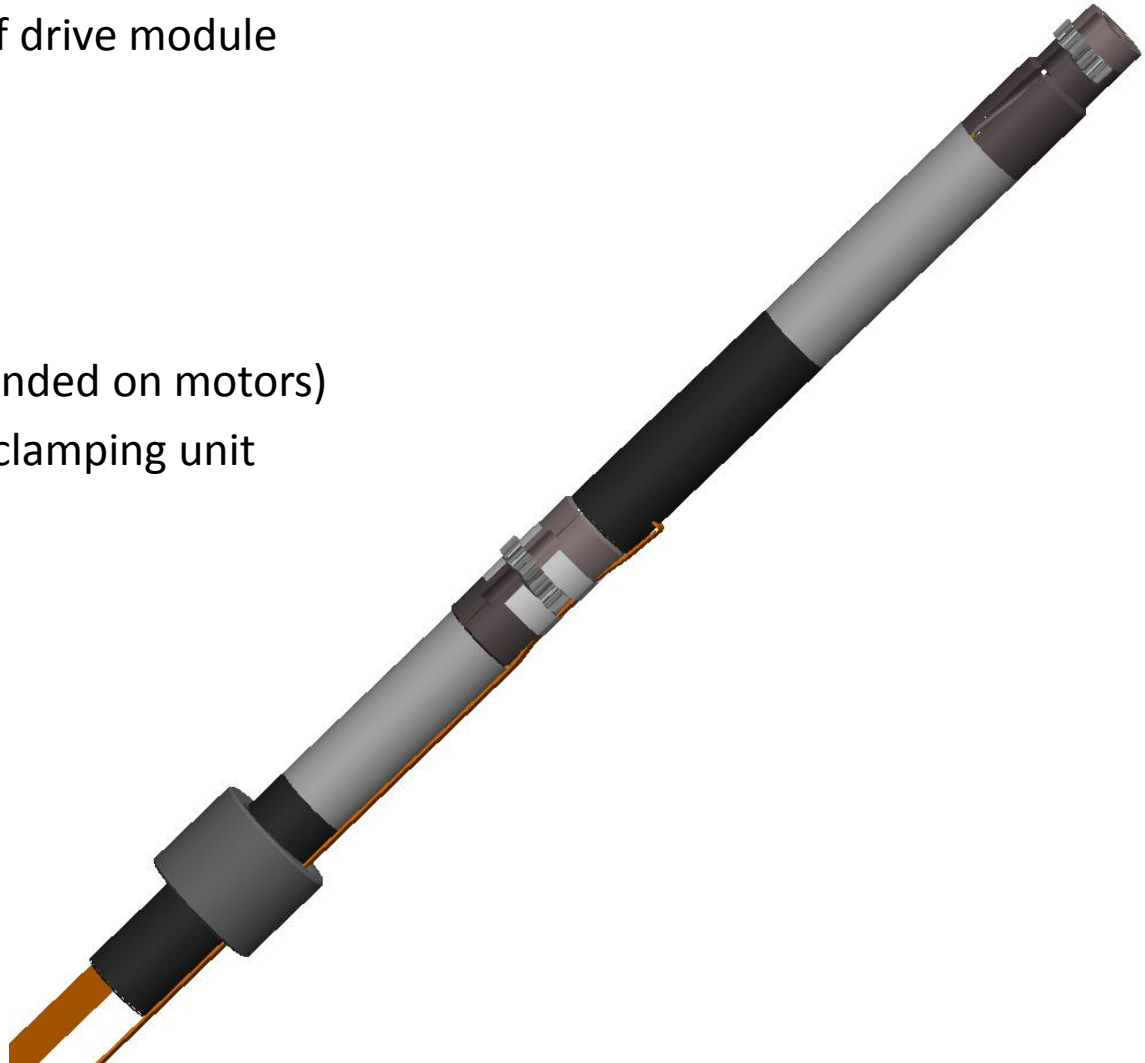


# Assembly Sequence

## 2<sup>nd</sup> Step Assembly of drive module

Includes:

- Theta motor
- R motor
- Gear modules (bonded on motors)
- Interface ring for clamping unit

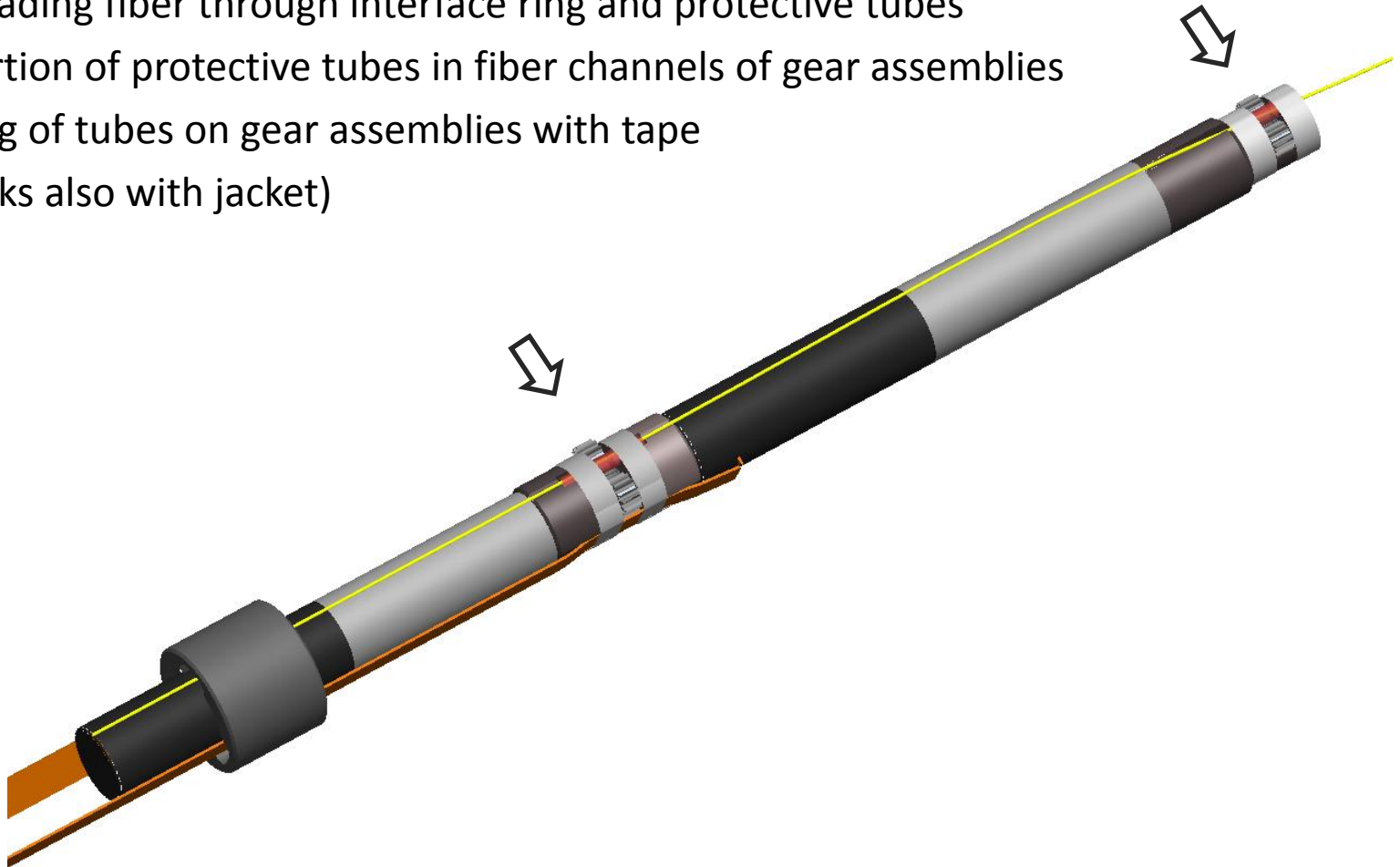




# Assembly Sequence

## 3<sup>rd</sup> Step Fiber attachment on drive module

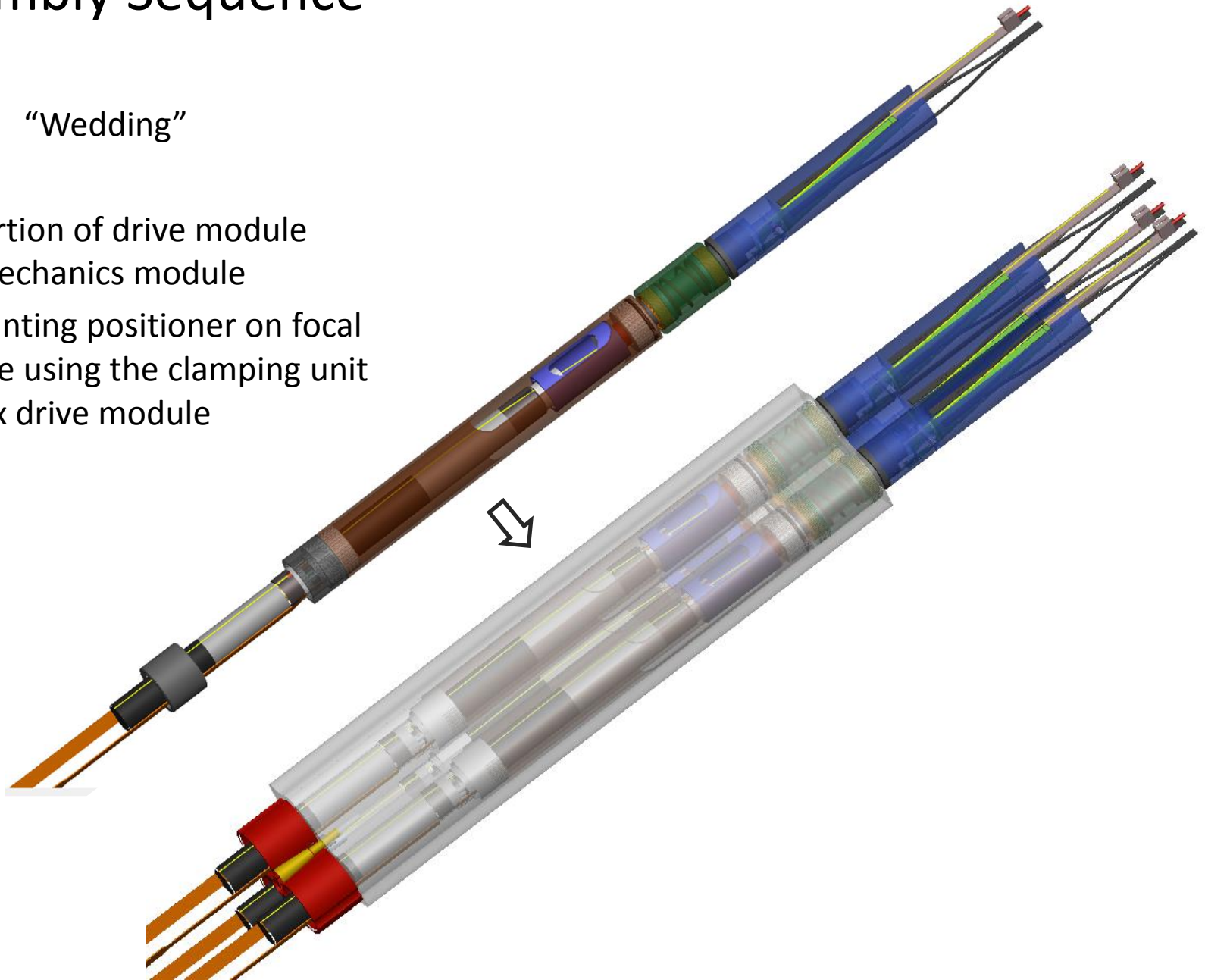
- Threading fiber through interface ring and protective tubes
- Insertion of protective tubes in fiber channels of gear assemblies
- Fixing of tubes on gear assemblies with tape
- (works also with jacket)



# Assembly Sequence

## 4<sup>th</sup> Step “Wedding”

- Insertion of drive module in mechanics module
- Mounting positioner on focal plane using the clamping unit to fix drive module



# Concluding Thoughts

## Positioner with 2 gear modules

### Advantages

- Arbitrary and unlimited cam rotation (no risk of fiber damaging)
- Easy assembly of positioner
- Easy replacement of broken drives and electronics
- Multiple strategies to mount positioner on focal plane
- Very short length of positioner

### Drawbacks

- Fiber twisting (?)

 ***Time for prototyping!***